

TECHNOLOGY@ROCKY FLATS

Demonstration & Deployment Summary

Contamination Survey Rate Logger System increases accuracy of contamination surveys

Summary

Prior to decontamination and again prior to demolition, extensive measurements for radioactive contamination must be performed on large expanses of floors, walls and ceilings in buildings where radioactive materials have been used. At RFETS, where alpha-emitting radioactive material is the principal contaminant, these surveys are tedious, time consuming and subject to human error because the radiation detector must be held in close proximity to the contaminated surface.

A new data collection system, which can be mounted on any manually or automatically powered moving platform, was developed to collect, measure and record location information and contamination levels from several different radiation detectors. The output can be imported into various geographical information systems resulting in a map that illustrates the residual surface contamination levels in the facility.

The result of this development is faster, more accurate contamination surveys and survey reports.

The Need

After processing equipment has been removed from a facility, characterization surveys are performed to guide final decontamination efforts. These surveys must be performed rapidly and in adequate detail for the intended use. Traditional alpha and beta survey methods are time consuming to perform and document as they require a radiological control techni-

cian to scan every surface using a hand-held probe, stopping whenever an indication of elevated count rate occurs. Field notes are taken and later transcribed into hand-written survey maps. After decontamination is performed, similar, but more extensive surveys are performed to demonstrate the adequacy of decontamination and document that the facility is no longer contaminated above unrestricted release limits. Survey results are then manually entered into a reporting database where summary reports are created for review and approval by management and regulatory officials. The overall survey and documentation process is slow, labor intensive and error prone.

The Technology

The automated survey system is composed of off-the-shelf hardware, controlled by a Windows-based laptop computer program using National Instruments LabView programming language. Data necessary to generate a high quality report is collected prior to initiation of a survey.

Facility identification, starting location, date, operator's name, calibration dates of each component, and counting efficiency of each detector are recorded. A Leica DISTOpro laser range finder provides position information each second within 1-mm accuracy with respect to the nearest wall. Three Ludlum Model 2360 rate meters power and process signals from NE AP6 contamination probes that measure radioactive contamination over an 8



Figure 1, The main interface screen provides the interface for viewing progress of the survey as it is being acquired. It also is the screen from which all other screens are accessed.

x 10-inch area. Each second, the count rate from each Ludlum meter is reported.

Count rate data is converted to useful units of activity per square meter based on individual instrument efficiencies, probe size, background count rate and rate of travel.

The average and maximum contamination level in the most recent square meter is reported. User selectable low-and high-level alarms alert the technician immediately when elevated areas of contamination are discovered. The operator selects from several pre-defined survey patterns, analogues to how a baseball groundskeeper follows a pattern when mowing the infield. Figure 1 shows an example of the operator's screen during use.



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Technology Supporting the Path to Closure

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